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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/728,811	12/08/2003	Geum-Jong Bae	239/161 DIV	9264

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EXAMINER	
HOGANS, DAVID L	

ART UNIT	PAPER NUMBER
2813	

DATE MAILED: 05/21/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/728,811	BAE ET AL.	
	Examiner	Art Unit	
	David L. Hogans	2813	

-- The MAILING DATE of this communication appears on the cover sheet with the correspond nc address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *08 December 2003*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *13-16* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *13-16* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *08 December 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☒ Certified copies of the priority documents have been received in Application No. 10/103,759.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *12-08-03*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

This Office Action is in response to the Transmittal of New Application filed on December 8, 2003.

Priority

1. Acknowledgment is made of applicant's claim for foreign priority under 35 U.S.C. 119(a)-(d). The certified copy has been filed in parent Application No. 10/103,759, filed on March 25, 2002.

Information Disclosure Statement

2. The information disclosure statement (IDS) submitted on December 8, 2003, is in compliance with the provisions of 37 CFR 1.97, and accordingly, has been considered by the examiner.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 13-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over 6,506,650 to Yu in view of 6,440,875 to Chan et al. further in view of Microchip Fabrication – A Practical Guide to Semiconductor Processing (2000) to Van Zant.

Claim 13

Yu teaches a gate pattern (16) formed on a semiconductor substrate (12); an L-shaped second spacer (28) having a horizontal protruding portion, the second spacer being formed on a sidewall surface of the gate pattern; an L-shaped third spacer (26) having a vertical sidewall between a vertical sidewall of the L-shaped second spacer (28) and the gate pattern (16) and a horizontal protruding portion between the protruding portion of the L-shaped second spacer (28) and the substrate (12); a high-depth junction area (42) formed in the substrate beyond the L-shaped second spacer; a low-depth junction area (44) formed in the substrate under the horizontal protruding portion of the L-shaped second spacer; and a medium-depth junction area (between areas 42 and 44) positioned between the high and low depth junction areas. The Examiner notes that Yu also teaches that implantation depth is controlled by the geometry of the L-shaped spacer. (See Figures 1-6 and columns 2-4 lines 65-45)

Yu fails to explicitly teach wherein the L-shaped spacers are third and fourth spacers and that the high/medium/low depth junctions display corresponding concentration profiles.

However, Chan et al., in Figures 1-6 and columns 3-10 lines 40-17, teaches wherein third and fourth spacer layers are used to construct a graded source/drain structure. Additionally, Van Zant, on pages 348-349, teaches wherein an ion implantation profile follows a gaussian distribution.

Initially the Examiner notes that it is without moment as to whether the spacer layers are second and third or third and fourth because the concept of graded implantation holds regardless of the number assigned to the layer. Furthermore, it would have been obvious to one of ordinary skill in the art to modify Yu by incorporating a third and fourth spacer layer, as taught by Chan et al., to enhance dimensional control.

Finally, it would have been obvious to one of ordinary skill in the art to modify Yu by incorporating high/medium/low concentration junctions, as taught by Van Zant, because ion implantation profiles follow a gaussian distribution, which shows that implant concentration increases to a finite depth and then diminishes thereafter. The Examiner notes that the nested L-shaped spacer layers of Yu would prevent implantation of many molecules into the medium concentration junction area, as well as, shift the concentration distribution because the nested L-shaped spacer layers add depth to the ion implanted gaussian distribution.

Additionally, the specification contains no disclosure of either the critical nature of the claimed arrangement (i.e. – third and fourth spacer layers) or any unexpected results arising therefrom. Where patentability is said to be based upon particular chosen limitations or upon another variable recited in a claim, the Applicant must show that the chosen limitations are critical. *In re Woodruff*, 919 F.2d 1575, 1578 (Fed. Cir. 1990)

Claim 14

Incorporating all arguments of Claim 13 and noting that Yu, Chan et al. and Van Zant teach wherein the medium and low concentration junction areas are formed under the protruding portion of the L-shaped third spacer. (See Yu at Figures 1-6 and columns 2-4 lines 65-45; Chan et al. at Figures 1-6 and columns 3-10 lines 40-17; and Van Zant at pages 348-349)

Claims 15 and 16

Incorporating all arguments of Claim 13 and noting that Yu teaches wherein the L-shaped third/fourth spacer is made of silicon oxide and wherein the L-shaped second/third spacer is made of material having an etch selectivity with respect to the L-shaped fourth spacer (i.e. – a nitride material). (See Yu at Figures 1-6 and columns 2-4 lines 65-45)

Further the Examiner notes that Chan et al. teaches wherein the L-shaped fourth spacer is made of silicon oxide and wherein the L-shaped third spacer is made of material having an etch selectivity with respect to the L-shaped fourth spacer. (See Chan et al. at Figures 1-6 and columns 3-10 lines 40-17)

Conclusion

5. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

US 6,153,483 to Yeh et al. teaches wherein a high/medium/low implantation is performed through first and second sidewall spacers and wherein deep source/drain regions are heavily doped and medium to low source/drain regions are lightly doped.

US 5,770,508 to Yeh et al. teaches wherein high/medium/low implantation is performed through first and second sidewall spacers.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to David L. Hogans whose telephone number is (571) 272-1691. The examiner can normally be reached on M-F (7:30-4:30).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Carl Whitehead Jr. can be reached on (571) 272-1702. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

dh

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